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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,542	03/31/2004	Choong Kooi Chee	884.C20US1	7169

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EXAMINER

GEYER, SCOTT B

ART UNIT PAPER NUMBER

2812

DATE MAILED: 06/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/815,542

Applicant(s)

CHEE, CHOONG KOOI

Examiner

Scott Geyer

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 and 31-44 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-16 and 32-44 is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-8 is/are rejected.
- 7) ☒ Claim(s) 4,9 and 31 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election without traverse of Group I (claims 1-16) in the reply filed on May 6<sup>th</sup>, 2005 is acknowledged.

Acknowledgement is made of applicant's cancellation of claims 17-30 and addition of new claims 31-44. New claims 31-44 are also drawn to Group I.

### ***Drawings***

The drawings are objected to because of minor informalities as follows:

Figure 6B: change "600" to - - 601 - - and change "112" to - - 612 - -.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New

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Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3 and 5-8 are rejected under 35 U.S.C. 102(e) as being anticipated by Cobbley et al. (6,897,096 B2).

As to **claim 1**, Cobbley et al. teach a process wherein an electrical bump 126 is disposed on a substrate 120, as shown in figure 1. In figure 4, a stress-compensation layer (i.e. an underfill material) is formed against the bumps 126, the substrate 120 and the film 110 (see also column 5, lines 50-67, continued to column 6, lines 1-59).

As to **claims 2 and 3**, Cobbley et al. teach removing the film which partially exposes the bumps (see figure 6).

As to **claim 5**, Cobbley et al. teach forming the stress-compensation layer by capillary underfill (column 6, line 54 et seq.).

As to **claim 6**, Cobbley et al. teach an underfill (stress-compensation) which has silica particles (column 6, line 47 et seq.).

As to **claim 7**, Cobbley et al. teach an underfill material which can be cured by heat, i.e. a thermoset material (see column 6, line 49).

As to **claim 8**, Cobbley et al. teach curing the underfill (see claim 7 above) and also coupling the electrical bump with an electrical contact (see figure 9).

***Allowable Subject Matter***

Claims 4, 9 and 31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art of record and to the examiner's knowledge does not teach or render obvious, at least to the skilled artisan, the instant invention regarding:

Partially embedding the electrical bump into the film, between 5% and 95% embedded, as recited in dependent claim 4;

Curing the stress compensation layer and coupling the electrical bump to an electrical contact, wherein the curing step is done after the electrical coupling, as recited in dependent claim 9;

Pushing the electrical bump into an uncured polymer spot on a board (i.e. substrate) as recited in dependent claim 31.

Claims 10-16 and 32-44 are allowed.

The following is a statement of reasons for the indication of allowable subject matter. The prior art of record and to the examiner's knowledge does not teach or render obvious, at least to the skilled artisan, the instant invention regarding:

A method comprising pressing an electrical bump against a compressible film wherein the electrical bump is partially embedded in the compressible film, and forming a stress-compensation layer between the substrate and the compressible film as recited in independent claim 10;

A method comprising pressing a flexible film utilizing a press-plate against an electrical bump and flowing a stress-compensation layer precursor material between the substrate and film and against the electrical bump, as recited in independent claim 33;

A method comprising pressing an electrical bump in a ball grid array against a compressible film using a press-plate, wherein the electrical bump partially embeds into the compressible film, combined with a step of injection molding a stress-compensation layer between the compressible film and the substrate, as recited in independent claim 40.

### ***Conclusion***

The following references are cited as being particularly related to the applicant's disclosure: Baba et al. (6,716,665 B2), Nakamikawa (6,518,093 B1) and Nakazawa et al. (6,429,043 B1).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott Geyer whose telephone number is (571) 272-

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1958. The examiner can normally be reached on weekdays, between 10:00am - 6:30pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

 6/22/05

Scott Geyer  
June 22, 2005